

## ***Interactive comment on “Caspian Sea level changes during the last millennium: historical and geological evidences from the south Caspian Sea”***

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Dear Prof. Jean-Daniel Stanley

Thank you for reading the article precisely and many thanks for your supportive comments. Here, is our response to your precious comments.

Comment 1: The title and contents of this article do not really meet expectations for a study that proposes comprehensive historical and geological explanations for sea-level changes in the south Caspian Sea.

Answer 1: As it was mentioned in the text (Page 1400, line 27), the main objective of

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this paper is providing a combination of historical documents and geological findings, mainly from south Caspian Sea, to propose a more accurate sea level curve during the last millennium. To satisfy this objective, we used a wide range of historical and geological data and combined them in Table 1 and Tables 3 to 7. Moreover, we have tried to independently test the accuracy of our findings from two short cores with the reconstructed curve. We think that the title of the paper reflects the main objectives and achievements of this study. Some other findings such as historical earthquakes and modulating of the Caspian sea-level fluctuation with solar activity, however, are not reflected in the title, as they are only secondary outcomes.

Comment 2: No in-depth considerations in the text are given as to the specific role of the frequent earthquakes, some powerful, that are distributed mostly in the mid- and southern sectors of this sea.

Answer 2: In this paper we have tried to show the importance of local irregularities such as seismicity and river avulsion in reconstructing Caspian Sea level fluctuations. The seismicity, especially, is important in reconstructing the sea level curve based on historical and archaeological evidence. For example, in page 1417, line 15-23, we have shown that how ignoring the seismicity of the region could lead to over-estimation of the Caspian Sea level by Brückner (1890). On the other hand, some researchers may link the long-term Caspian sea-level changes to hydroseismicity of the sea as Dotsenko et al. (2002) linked the sea-level fall of the MCA to 957 AD earthquake (Page 1418, Lines 9-14). Here, it should be mentioned that some geological records of the Caspian sea-level changes could be related to hydroseismicity of the sea. For example, during the MCA low-stand (950-1250 AD), Lahijani et al. (2009) dated a high-stand. Although we linked the contradiction to the uncertainties coupled with using age calibration method, it is probable that Lahijani et al. (2009) dated a catastrophic event such as local flooding of the coast due to an earthquake! Certainly, this needs more sedimentological and historical evidence to improve.

Comment 3: A good recent earthquake epicenter map would indicate to the uninformed

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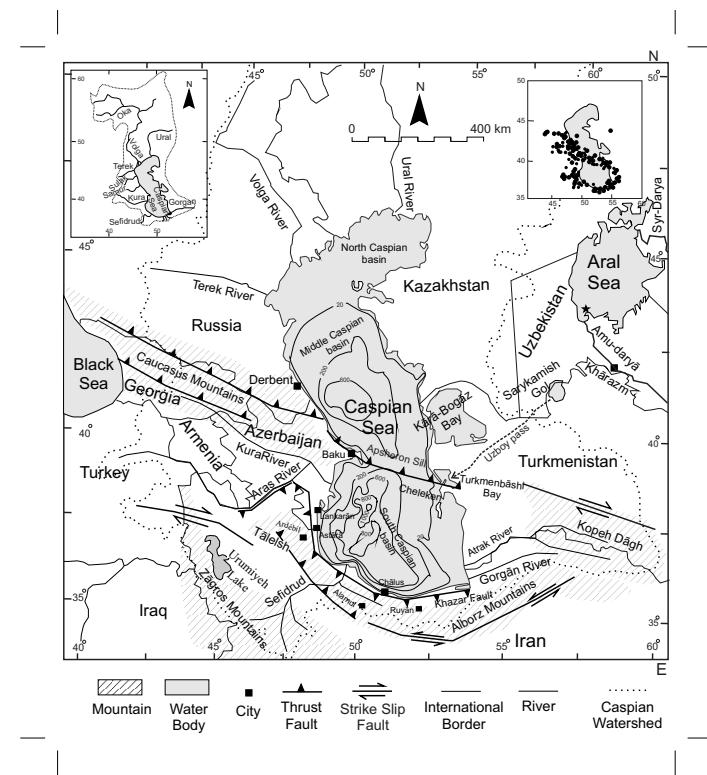
reader the direct role that land fluctuations in and around the sea have had on coastline elevations and sea level.

Answer 3: The complete seismicity of the Caspian Sea, both the deep and shallow earthquakes with their focal mechanisms and its tectonics, have been studied and published in Berberian (1983), Berberian (1994) and Jackson et al. (2002) which most of them have been cited in the paper. Moreover, we showed the major active faults of the region in Fig. 1 of the paper. However, we added an inset to Fig. 1, showing the recent earthquake epicenters of the region based on Jackson et al. (2002). As it is seen, the position of the epicenters and the active faults are the same.

In conclusion, we hope that these explanations adequately respond to the concerns. Hereby, we appreciate all of the reviewers for their suggestions and recommendations that lead us to revise our work in a better way.

Interactive comment on Clim. Past Discuss., 9, 1397, 2013.

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**Fig. 1.** Caspian Sea and its main features. The inset on the top right shows the recent earthquake epicenters (1968-1998) based on Jackson et al. (2002)

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